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(54) A traction machine for an elevator

(57) A traction machine for an elevator in which the reduction gearing means 4 of the driving motor is disposed within the sheave 5. One portion of the sheave forms a portion of the gear housing, and four driving motors 3 are provided outside the gear housing. This configuration reduces the distance between the sheave and the motors, which reduces the size of the traction machine.

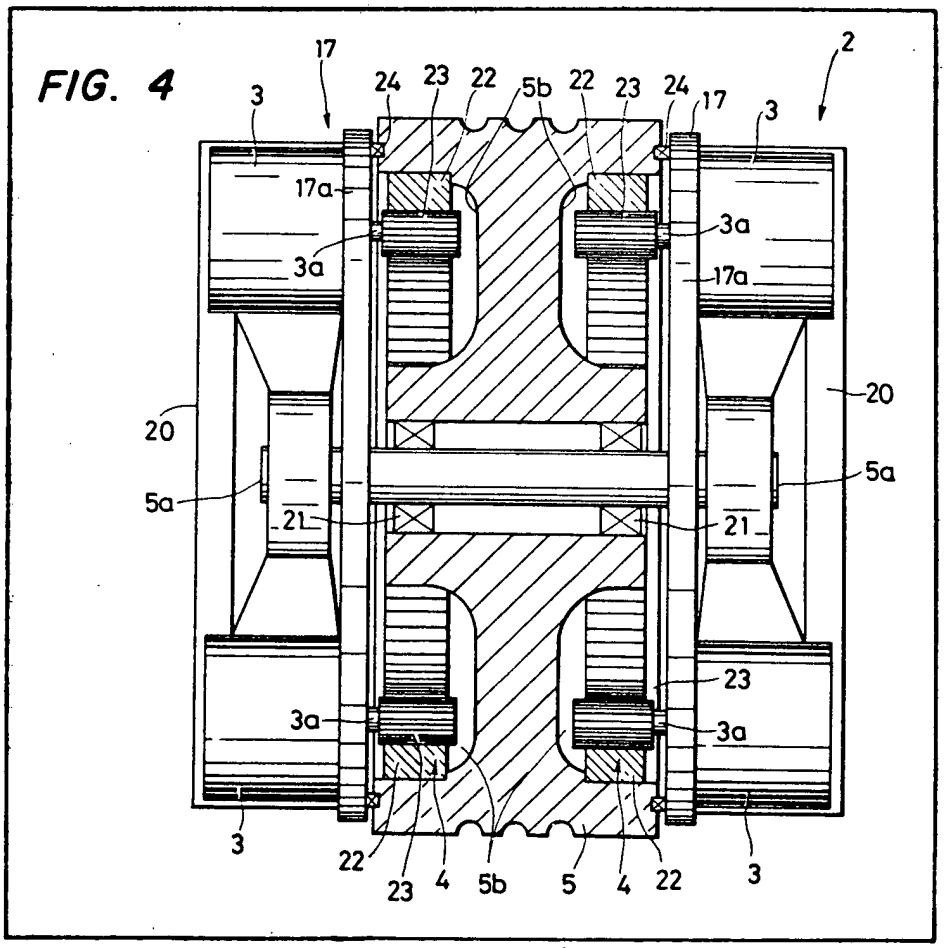

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FIG. 1
PRIOR ART

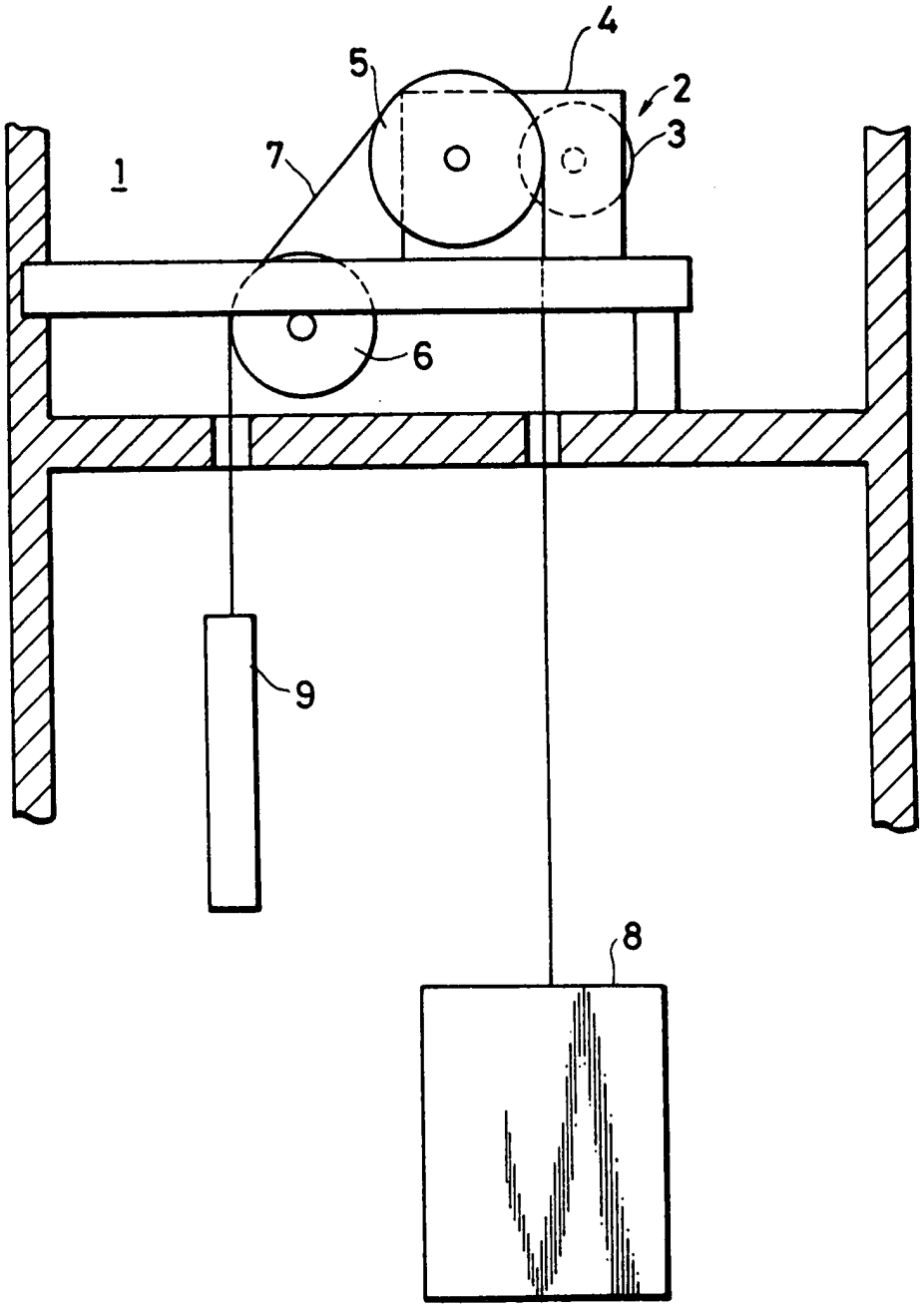

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FIG. 2
PRIOR ART

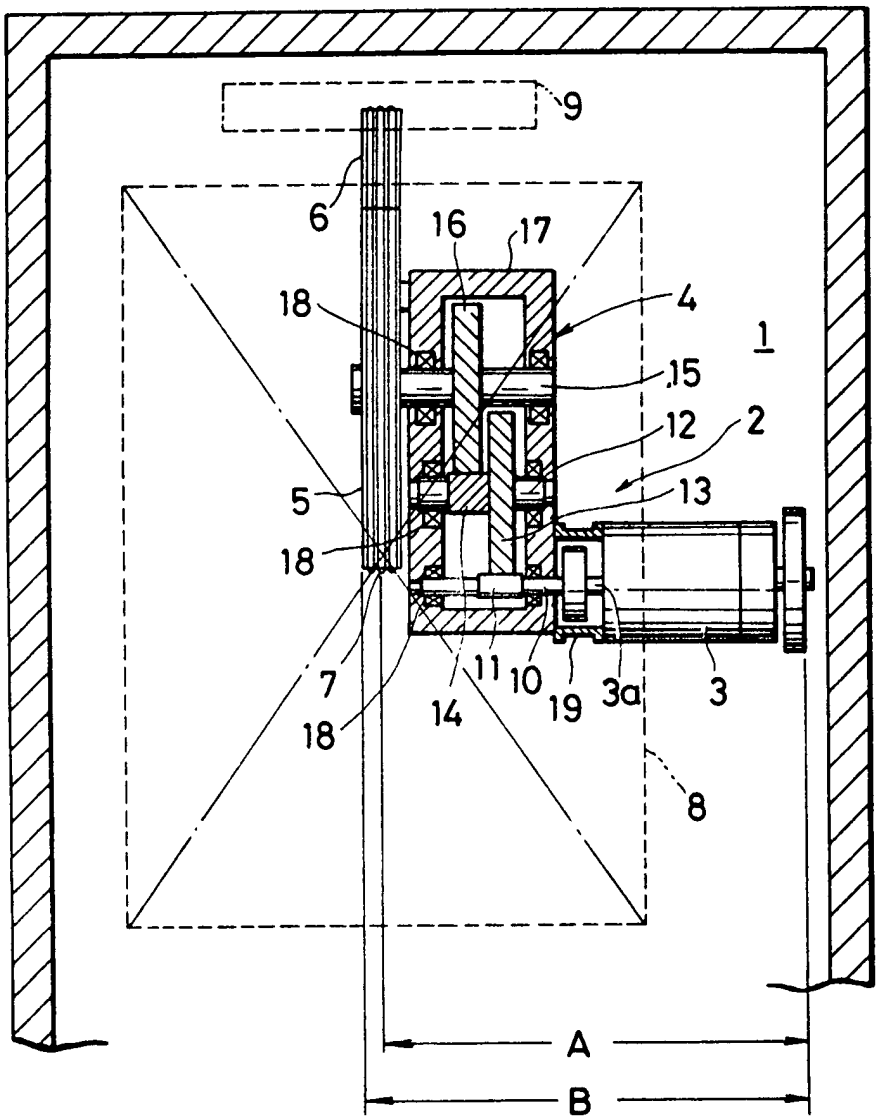

FIG. 3

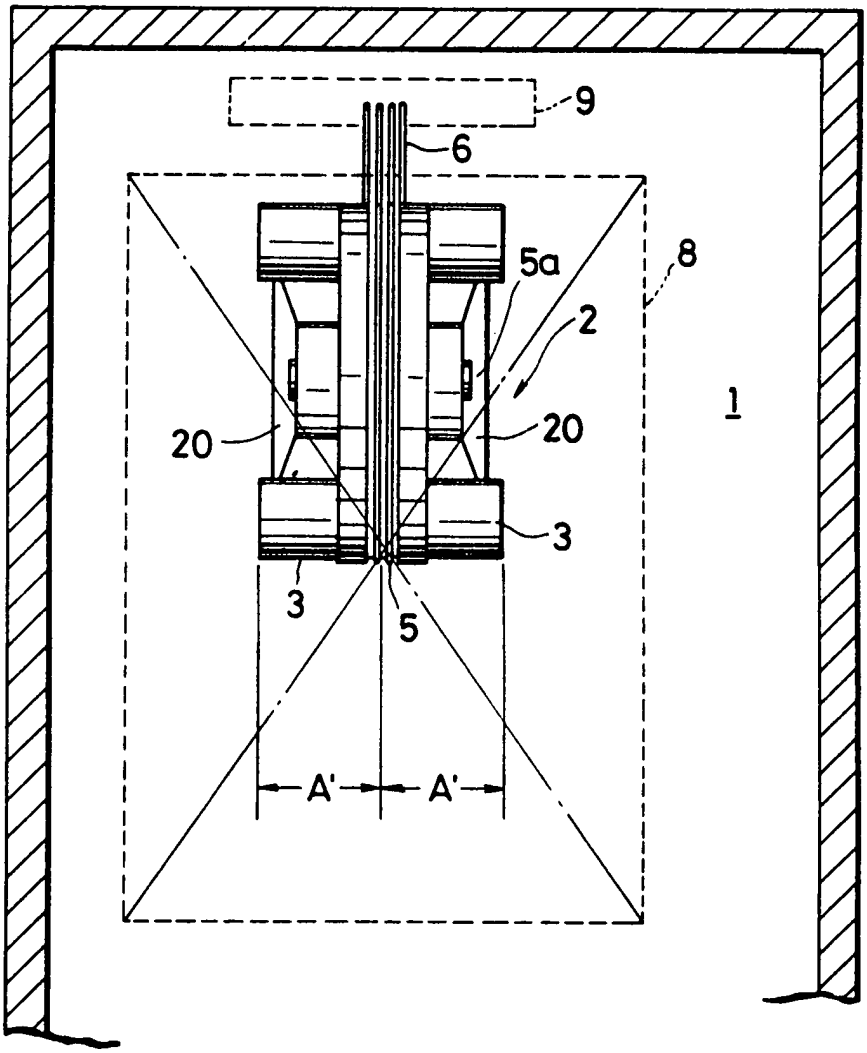

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FIG. 4

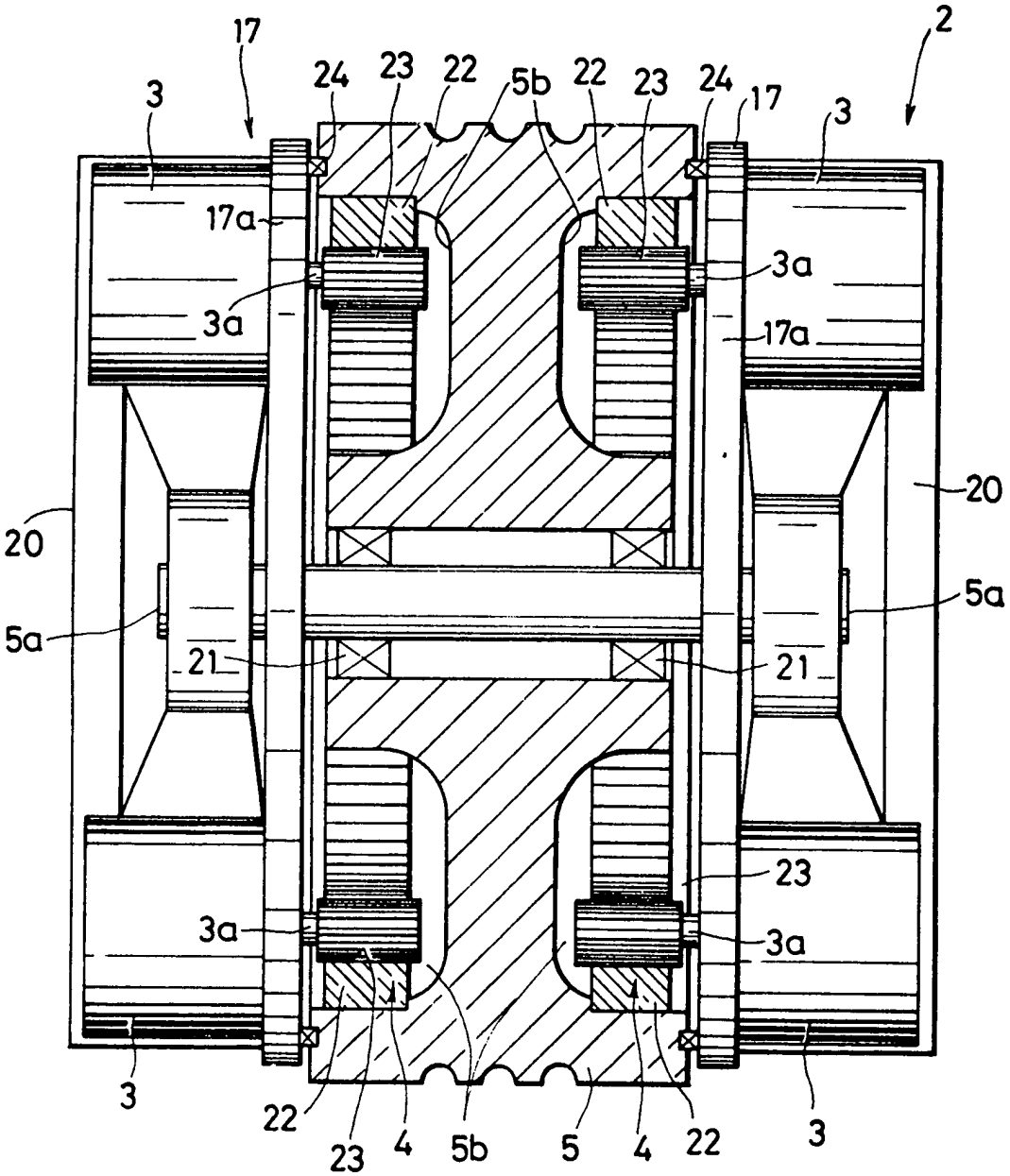

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FIG. 5

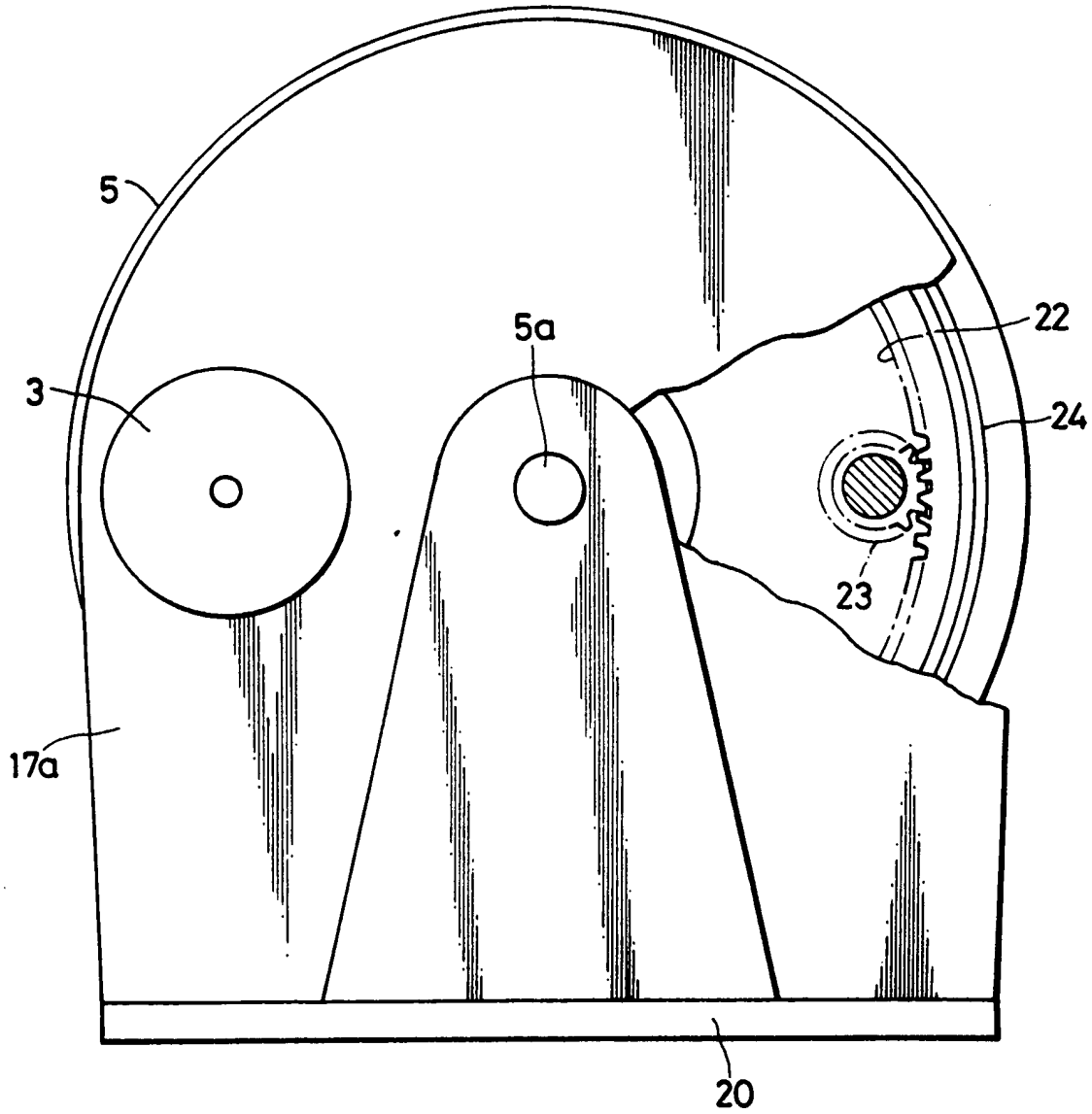

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FIG. 6

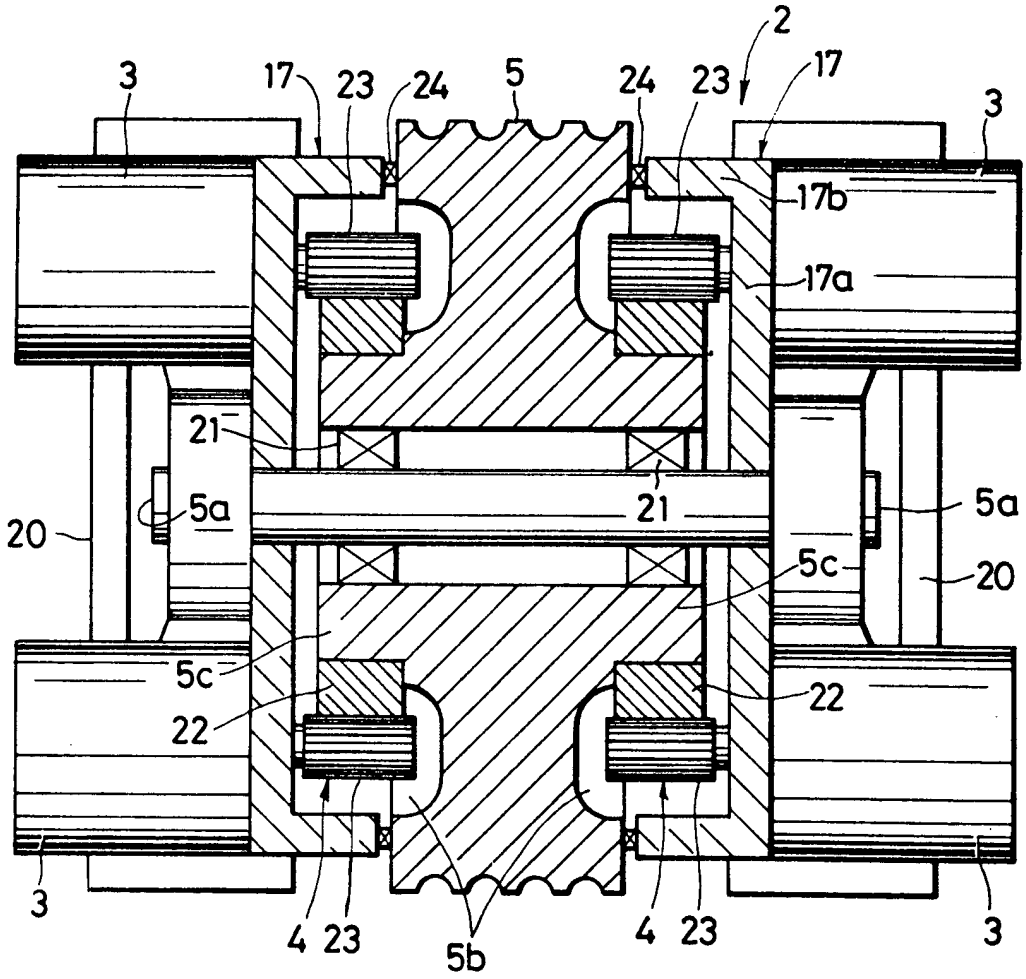

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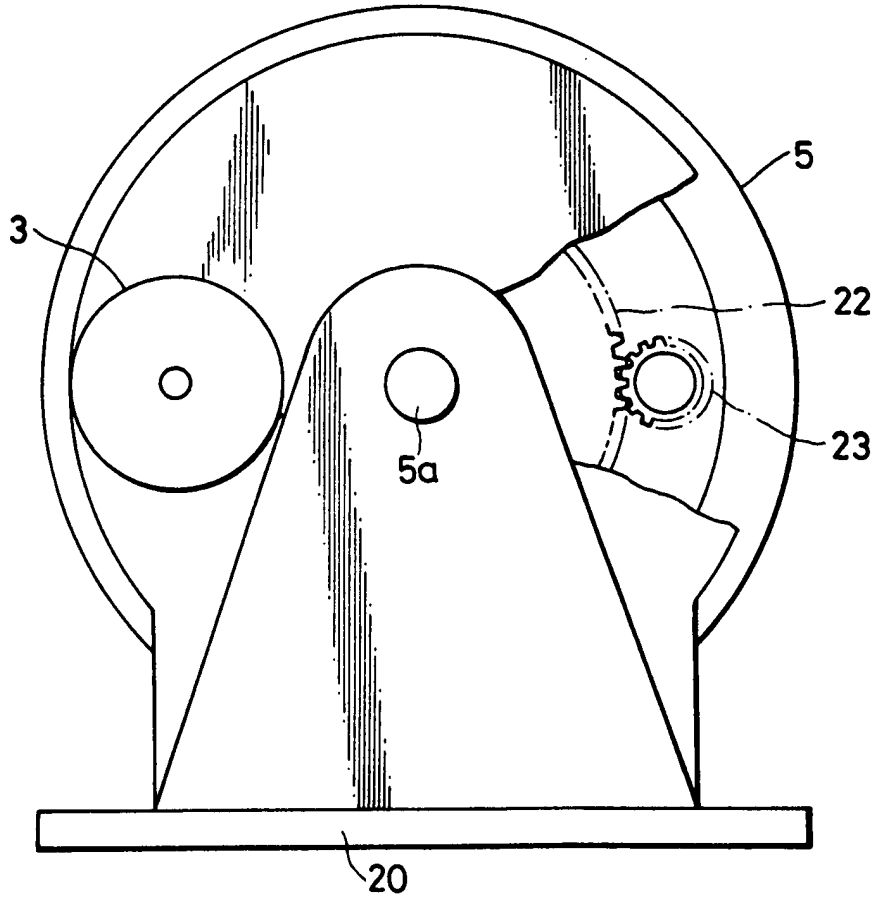
FIG. 7



SPECIFICATION

A traction machine for an elevator

Background of the Invention

The present invention relates to an improvement in a traction machine for an elevator.

An explanation of a conventional traction machine for an elevator will first be made with reference to Figs. 1 and 2. In Figs. 1 and 2, reference numeral 1 denotes a machine room which is provided above a raising and lowering passage. A traction machine 2 disposed in machine room 1 is constructed so that the drive power of an electrical motor 3 is reduced by a reduction device 4 (to be described hereinafter) and is transmitted to a main sheave 5. A main rope 7 is provided on both the main sheaves 5 and a deflecting sheave 6. One end of the main rope 7 is attached to a cage 8, and the other end thereof is connected to a balancing weight 9. In operation, the motor 3 is driven in the forward or reverse direction, imparting a rotation on the main sheave 5. The main sheave 5, via the main rope 7, accordingly raises and lowers the cage 8.

With reference to Fig. 2, in the traction machine 2 the input shaft 10 of the reduction means 4 is coupled to a shaft 3a of the motor 3. A first gear 11 which is fixed to the input shaft 10 is engaged with a second gear 13 fixed to a middle shaft 12. A final gear 16 which is fixed to an output shaft 15 is in engagement with a third gear 14 which is also fixed to the middle shaft 12. The main sheave 5 is fixed to the output shaft 15. The above-mentioned input shaft 10, middle shaft 12 and output shaft 15 are supported by a gear housing 17 via bearings 18. A cylindrical bracket 19 is fixed between housing 17 and the motor 3 in such a way as to encircle both the coupling portion of the shaft 3a and the input shaft 10. The main sheave 5 is disposed outside of the gear housing 17 at a position opposite to the motor 3 of the reduction device 4.

In the above-described traction machine, the motor 3 and the main sheave 5 are disposed on both sides of the reduction device 4, and since a portion of the gear housing 17 is disposed between the main sheave 5 and the final gear 16 of the reduction means 4, the distance between the main sheave 5 and the final gear 16 is great. As a consequence, as shown in Fig. 2, a distance A from the center of the main sheave 5 to the end of the motor 3 at the side opposite from the reduction means 4 is relatively great. Hence, in the elevator of traction motors of the prior art, it is impossible (or at least quite difficult) to set the traction machine, due to the size and configuration of the machine room 1. Also, the maintenance of the traction machine becomes more complicated as the size of the traction machine increases.

Summary of the Invention

It is thus an object of the present invention to reduce the size of elevator traction machines.

It is another object of the invention to produce an elevator traction machine which is easily disposed within a machine room having a small solumetric area.

These and other objects of the present invention are realized by providing driven means such as a final gear of a reduction device of a sheave, forming one portion of a gear housing of the reduction device with one portion of the sheave, and providing a plurality of motors at the outside thereof.

Brief Description of the Drawings

In the detailed description to follow, reference will be made to the accompanying drawings, in which:

Fig. 1 is a schematic side elevational view of a conventional traction machine for an elevator with a vertical cross-sectional view of the machine room thereof;

Fig. 2 is a view as in Fig. 1 with a horizontal cross-sectional view of the machine room;

Fig. 3 is a plan view of a traction machine for an elevator in accordance with one embodiment of the present invention with a transversal cross-sectional view of the machine room;

Fig. 4 is an enlarged cross-sectional side view of the traction machine as shown in Fig. 3;

Fig. 5 is a partially cut away end view of the traction machine as shown in Fig. 4;

Fig. 6 is a cross-sectional side view of a traction machine for an elevator according to a second embodiment of the present invention; and

Fig. 7 is a partially cut away end view of the traction machine as shown in Fig. 6.

Detailed Description of the Preferred Embodiments

With reference to Figs. 3—5, a first preferred embodiment of the present invention will be described, wherein like reference numerals denote similar elements. In Fig. 4, a sheave shaft 5a is supported by a pair of right and left shaft supports 20. The sheave 5 is rotatably fitted to the sheave shaft 5a via bearings 21. Annular recessed portions 5b are formed at both sides of the sheave 5. Final gears 22 are fittingly engaged to recessed portions 5b. The gears 22 are composed of internal gears on the outer peripheral surfaces of the recessed portions 5b. Base plates 17a of a gear housing 17 are integrally formed on each shaft support 20 at both external sides of the sheave 5. The base plates 17a cover the annular recessed portions 5b. The base plates 17a and the sides of the sheave 5 form the gear housing 17. Two motors 3, are attached at the outside surfaces of the base plates 17a in such a way as to be symmetrical with respect to the sheave shaft 5a. The shafts 3a of the motors 3 (which total four in this preferred embodiment) extend into the annular recessed portions 5b and are parallel to the sheave shaft 5a. First gears 23 are arranged within recessed portions 5b and are fittingly engaged with the shafts 3a of the motors 3. The final gears 22 engage the first gears 23 constituting the right and left reduction means 4. In Fig. 4, reference numeral 24 denotes oil seals